

# 1

U N I T

# Water Resources

WARM-UP

INTENSIVE READING

PRACTICAL READING



## Learning Objectives

After studying this unit, you'll be able to:

- know the Earth's water storage and related statistics
- learn some tips on sampling water
- have a general idea of the water cycle
- understand the significance of the South-to-North Water Diversion Project

### EXTENSIVE READING

### READING INTO CHINA

## Warm-up

**Task 1** Match the English terms with their Chinese equivalents.

1 salt water

2 fresh water

3 groundwater

4 ice cap and glacier

5 surface water

6 ocean

**A** 海洋

**B** 咸水

**C** 淡水

**D** 冰盖和冰川

**E** 地下水

**F** 地表水

1 condensation

2 evaporation

3 infiltration

4 run-off

5 precipitation

6 snowmelt

**A** 冷凝

**B** 径流

**C** 蒸发

**D** 降水

**E** 下渗

**F** 融雪水



# Intensive Reading

## Reading Skill

### 做笔记 ( Taking notes )

阅读时做笔记有很多好处：集中注意力，发现重点，组织思路，引发反思。做笔记时还可以独创一些属于自己的符号来标记内容。



## Words & Phrases

### Words

vapor /'veɪpər/ *n.* 蒸汽，水汽  
approximately /ə'prɔːksəmətli/ *adv.* 大约，大概  
precipitate /prɪ'sɪpɪteɪt/ *v.* (水汽等) 凝结 (成雨、露、雪等)  
evaporate /ɪ'væpəreɪt/ *v.* (使) 蒸发  
atmosphere /'ætməsfɪr/ *n.* 大气  
vegetation /ˌvedʒɪ'teɪʃən/ *n.* 植物 (总称)  
proportion /prə'pɔːrʃən/ *n.* 部分  
cap /kæp/ *n.* (对事物起保护作用的) 盖，罩  
marsh /mɑːʃ/ *n.* 沼泽，湿地  
wetland /'wetlənd/ *n.* 湿地  
shallow /'ʃæləʊ/ *adj.* 浅的  
available /ə'veɪləbəl/ *adj.* 可用的，可获得的  
scarce /skɜːs/ *adj.* 缺乏的

### Phrases

account for 占 (一定数量或比例)  
be rich in 富含某物  
per capita 人均 (的)

# How Much Water Is There on Earth?

<sup>1</sup> Most of the Earth, about 70%, is covered by water. Water also exists in the air as **vapor** and in the soil as groundwater. The world's water storage is **approximately** 1,400,000,000 km<sup>3</sup>.

<sup>2</sup> Each year, on land, about 119,000 km<sup>3</sup> of water **precipitates** and 72,000 km<sup>3</sup> **evaporates** into the **atmosphere** from soil and **vegetation**; while 458,000 km<sup>3</sup> of water falls into the ocean and 505,000 km<sup>3</sup> evaporates from its surface. Therefore, the amount of water that evaporates nearly equals that of precipitation, and the global water balance is maintained.

<sup>3</sup> Salt water accounts for 97.5% of the total water storage on Earth, and most of it is stored in oceans. The remaining 2.5% is fresh water.

<sup>4</sup> As for fresh water on Earth, the total storage is about 35,000,000 km<sup>3</sup> and nearly all of it is unavailable. The largest **proportion** of fresh

water is stored in glaciers and ice **caps**, mainly in the polar regions and Greenland. This forms 69% of the world's total fresh water. Another 30% of fresh water is groundwater. The last 1% of fresh water can be found in the atmosphere as water vapor, or in rivers, lakes, soils, **marshes** and **wetlands**, plants, and animals. Among them, rivers, freshwater lakes, and **shallow** groundwater represent an **available** water resource for humans, and those only occupy 0.3% of the total freshwater storage.

<sup>5</sup> Therefore, though the globe is rich in water, the fresh water that humans can use is **scarce** and precious. As for China, freshwater resources per capita are approximately 2,200 m<sup>3</sup>, about one quarter of the global average. It's important for us to take actions to conserve water resources, such as reducing water pollution and recycling water.



## Notes

1. Each year, on land, about 119,000 km<sup>3</sup> of water precipitates and 72,000 km<sup>3</sup> evaporates into the atmosphere from soil and vegetation... (Para 2)  
每年约有 11.9 万立方千米的水通过降水落到地面，约有 7.2 万立方千米的水通过土壤或植物蒸发进入大气层……
2. Therefore, the amount of water that evaporates nearly equals that of precipitation, and the global water balance is maintained. (Para 2)  
因此，蒸发的水量几乎和降水量相等，从而全球的水平衡得以维持。  
that 和 those 若跟有介词短语，可以用来代表前面提到的事物，以避免重复，等于“the + 前面的名词”。在此句中，equals that of precipitation 中的 that 等于 the amount.
3. Therefore, though the globe is rich in water, the fresh water that humans can use is scarce and precious. (Para 5)  
因此，尽管地球上丰富的水资源，人类可以使用的淡水却是稀缺且珍贵的。  
此句中，that humans can use 是由 that 引导的定语从句，用来修饰先行词 the fresh water。而因为 that 在从句中作宾语时常常被省略掉，此句也可写作“... the fresh water humans can use...”。

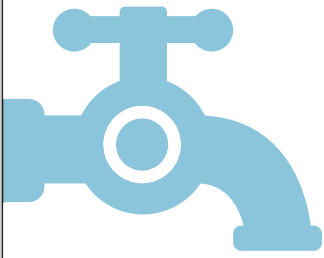
## Task 2 Match the words with their meanings in the text.

- 1 approximately
  - a. more or less than a number or an amount
  - b. having no mistakes
- 2 vegetation
  - a. plants in general, especially the plants that are found in a particular area or environment
  - b. a plant that is eaten raw or cooked
- 3 marsh
  - a. a soft, sweet, spongy food that is used to make sweets or cakes
  - b. an area of land which is very wet and muddy
- 4 shallow
  - a. measuring only a short distance from the top to the bottom
  - b. darkness caused by something preventing light from reaching a place
- 5 scarce
  - a. not enough of something
  - b. more than enough in quantity

## Task 3 Decide whether the following statements are true (T) or false (F).

- 1 Most of the Earth's surface is covered by water.
- 2 Water only exists on the surface of the Earth.
- 3 Oceans store a large proportion of the Earth's water.
- 4 Most of the fresh water is available.
- 5 The water supply on Earth that is drinkable takes a very small percentage of the total amount.





# Water Sampling Tips

*Follow the tips when taking investigational samples from faucets.*

*Failure to adhere to these methods could result in inaccurate sample results, which will require further sampling and investigation at unnecessary expense. The work must be carried out by trained and certified personnel only.*

- Always sample the cold water.
- Use a clean, indoor faucet.
- Try to avoid threaded faucets, leaky faucets, and faucets with swivel spouts.
- Allow the water to run in a steady stream for at least five minutes before collecting the sample or until the pump runs.
- Maintain a steady low-flow stream.
- Do not sample through a hose or treatment device.
- Do not set the bottle cap upside down.
- Do not touch the inside of the cap or bottle.
- Do not allow the cap or bottle to touch the faucet.
- Do not rinse the bottle. Fill it to the fill line. Do not overfill it.
- Seal the bottle after sampling.
- Enclose the submission slip and payment sheet with the sample.
- Send the sample to the lab on the day of collection.

**Task 6 Match the phrases with their meanings in the text.**

- 1 water sampling
- 2 indoor faucet
- 3 threaded faucet
- 4 treatment device
- 5 sample result

- A 室内水龙头
- B 采样结果
- C 处理装置
- D 水采样
- E 螺纹水龙头

**Task 7 Translate the following sentences into Chinese.**

- 1 Failure to adhere to these methods could result in inaccurate sample results, which will require further sampling and investigation at unnecessary expense.  
\_\_\_\_\_
- 2 Allow the water to run in a steady stream for at least five minutes before collecting the sample or until the pump runs.  
\_\_\_\_\_
- 3 Do not set the bottle cap upside down.  
\_\_\_\_\_
- 4 Do not allow the cap or bottle to touch the faucet.  
\_\_\_\_\_
- 5 Send the sample to the lab on the day of collection.  
\_\_\_\_\_

**Words & Phrase**

**Words**

- sample /'sæmpəl/ v. 从……中抽样 n. 样本, 样品
- faucet /'fəʊsɪt/ n. 水龙头
- thread /θred/ v. 刻螺纹于
- swivel /'swɪvəl/ n. 旋转接头, 旋轴
- steady /'stedɪ/ adj. 平稳进行的, 持续的
- pump /pʌmp/ n. 泵
- hose /həʊz/ n. 软管
- rinse /rɪns/ v. 冲洗
- overflow /'əʊvərfɪl/ v. 把……装得太满
- seal /si:l/ v. 把……封住, 封闭
- enclose /ɪn'kləʊz/ v. 随……附上
- submission /səb'mɪʃən/ n. 提交 (物)
- slip /slɪp/ n. 小纸条, 纸片

**Phrase**

adhere to sth 遵守, 坚持

**Notes**

1. 水采样是水质检测的重要环节。水质检测是指对水中的化学物质、悬浮物、底泥和水生态系统进行统一的定时或不定时的监控和检测, 测定水体中污染物的种类、浓度及变化趋势, 评价水质状况等。
2. Enclose the submission slip and payment sheet with the sample.  
随水样附上提交单和付款单。





## Water Cycle

<sup>1</sup> Water on Earth is always changing. Its repeated changes make a cycle. As water goes through its cycle, it can be a solid (ice), a liquid (water), or a gas (water vapor). Ice, liquid water and water vapor are three different states of water. Water can be changed from one state to another.

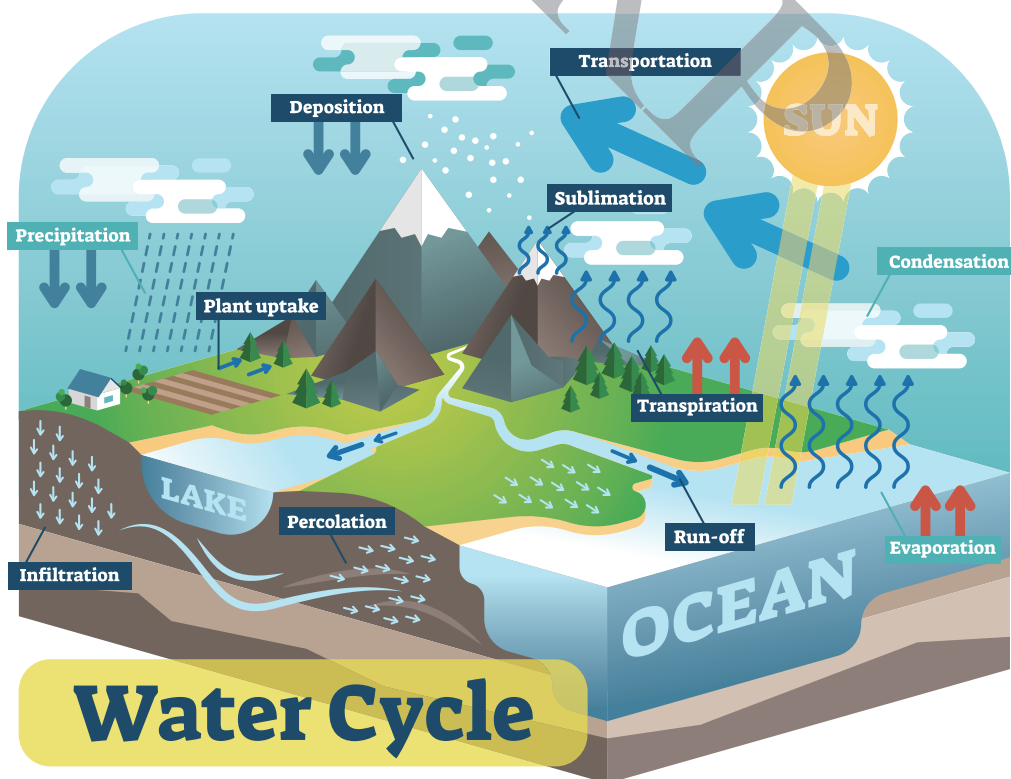
<sup>2</sup> How do these changes happen? Absorbing or releasing heat activates the cycle. If heat is added to water, water evaporates. Evaporation turns liquid water into a gas, i.e. water vapor. If heat is released from water vapor, the latter condenses. Condensation turns water vapor into liquid water. Liquid or solid water in the cloud, e.g. rain, falls on the Earth's surface, and that is called precipitation.

<sup>3</sup> In this way, the water cycle is often considered

as a simple cycle of evaporation, condensation, and precipitation. Although this can be a useful model, the reality is much more complicated. The paths and influences of water passing through the Earth's ecosystems are extremely complex.

<sup>4</sup> To start with, the three states of water tie together the major parts of the Earth's climate system—air, clouds, oceans, lakes, vegetation, snowpack, glaciers, etc. Then the water cycle shows the continuous movement of water within the Earth. It is a complex system that includes many different processes:

- Liquid water evaporates as water vapor, condenses into clouds, and precipitates back to the Earth in the form of rain, snow, etc.
- Water in different states moves through the atmosphere (transportation).



- Liquid water flows across the land (run-off), into the ground (infiltration and percolation), and through the ground.
  - Groundwater moves into plants (plant uptake) and evaporates from plants into the atmosphere (transpiration).
  - Solid ice and snow can turn directly into a gas (sublimation). The opposite can also take place when water vapor becomes solid (deposition).
- 5 The water cycle impacts ecosystems, economies, and our daily life. If water didn't naturally recycle itself, we would run out of clean water, and this is hard to imagine.

**Task 8** Fill in the blanks with the proper form of the words in the boxes.

cycle   condensation   percolate  
heat   absorb   uptake   solid  
vaporize   evaporate   tie

- 1 Frogs \_\_\_\_\_ water through their skins.
- 2 The cooler temperatures cause a gas to \_\_\_\_\_ into a liquid.
- 3 This \_\_\_\_\_ repeats itself infinitely.
- 4 Ice needs \_\_\_\_\_ to melt.
- 5 Is it a(n) \_\_\_\_\_, a liquid or a gas?
- 6 Rainwater \_\_\_\_\_ down through the rock.
- 7 He \_\_\_\_\_ the ends of the plastic bag together.
- 8 Water \_\_\_\_\_ condenses to form clouds.
- 9 These forests have higher carbon \_\_\_\_\_ rates over the long term.
- 10 \_\_\_\_\_ is an important part of the water cycle.

## Words & Phrases

### Words

- cycle /'saɪkəl/ *n.* 循环  
 solid /'sɒlɪd/ *n.* 固体 *adj.* 固体的  
 liquid /'lɪkwɪd/ *n.* 液体 *adj.* 液态的  
 condense /kən'dens/ *v.* (使) 凝结, (使) 冷凝  
 ecosystem /'i:kəʊsɪstəm/ *n.* 生态系统  
 run-off *n.* 径流  
 percolation /pə:'rɪkə'leɪʃən/ *n.* 渗透  
 uptake /'ʌptek/ *n.* 吸收  
 transpiration /trænspə'reɪʃən/ *n.* 蒸腾  
 sublimation /sʌblə'meɪʃən/ *n.* 升华  
 deposition /,dɪ:pə'zɪʃən/ *n.* 凝华

### Phrases

- to start with 首先  
 tie together sth 把……捆在一起

## Notes

1. As water goes through its cycle, it can be a solid (ice), a liquid (water), or a gas (water vapor). (Para 1)  
 水在循环过程中可以是固态(冰)、液态(水)或气态(水蒸气)。  
 此句中, as 引导的时间状语从句位于主语前面。当状语从句在主句前面时, 如果两句的主语指同一事物, 则整个句子的任意一个主语都可用代词表示, 故此句也可改为 “As it goes through its cycle, water can be a solid (ice), a liquid (water), or a gas (water vapor).”。
2. The paths and influences of water passing through the Earth's ecosystems are extremely complex. (Para 3)  
 水通过地球生态系统的路径及其影响极其复杂。  
 此句中, 现在分词短语 passing through the Earth's ecosystems 作后置定语修饰名词 water。作定语的现在分词和谓语动词必须表示相同时间进行的动作, 否则只能用定语从句, 不能用后置定语。



## The South-to-North Water Diversion Project

- <sup>1</sup> The South-to-North Water Diversion Project (SNWDP) is a major strategic infrastructure aimed at alleviating severe water shortages in northern China, optimizing the allocation of water resources and improving the ecological environment. It is the largest and longest water diversion project in the world.
- <sup>2</sup> The SNWDP comprises three water diversion routes in eastern, central, and western China, diverting water from the lower, middle, and upper reaches of the Yangtze River respectively. It also connects four major rivers—the Yangtze River, the Huaihe River, the Yellow River, and the Haihe River. Thus, the SNWDP establishes a pattern of water resources allocation in China that regulates three south-north water routes and connects four west-east rivers.
- <sup>3</sup> The project has benefited a great number of people in China. It has provided water to some 280 counties of more than 40 large and middle-sized cities, easing water shortages in the north. It has helped Beijing and Tianjin, both of which have water resources per capita of only 292 cubic meters, ease extreme water shortages. More than 90% of the residential water in Zhengzhou is transferred from the south. Thanks to the project, more than five million people in the water-receiving areas of Hebei Province also bid farewell to high-fluoride water and brackish water after generations.
- <sup>4</sup> Now the western route is in the planning stage and is yet to be built. It will continue to extend water supply systems and improve water quality for areas still having problems with water supply.



# My Learning Log

I can use the new words and phrases to create sentences.

e.g. The water in the cloud **condenses** into rain and snow.

I can use the grammar I have learned to create sentences.

e.g. They build a highway **leading into the mountains**.

I think the reading skill helps me to...

e.g. remember the key points of a passage.

I'm still confused about...

e.g. the influences of human activities on the water cycle.

I'd like to know more about...

e.g. the condition of freshwater storage in China.